Medical School Hotline

The Role of Telemedicine in Medical Education

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The New Age:

We live in historic times. Not since the industrial revolution has the advent of new technologies so affected our lives. In fact, one is hard pressed to think of any activity of living today that remains unaffected by the new technology. We internalize one new development after another, without stopping to pause and reflect on how profoundly our lives are touched by technological developments. When we do step back and consider the "rate of change" of our electronic revolution, we find its pace both exhilarating and terrifying. Like it or not, this pace is accelerating.

Telecommunications, but one of the arts of the electronic age, is undergoing a transformation of heroic proportions. The attainment of a "global dial-tone," phone service that brings direct connection to phones all over the globe, an immense accomplishment, is already an accomplishment overlooked, accepted as pedestrian. Wireless communication, global cellular service, mobile email, fax and data transfer capability, infrared computer links and data transfers through the human contact of a handshake, are the exotic technologies that now catch the eye.

Telemedicine: Not a Discipline

"Telemedicine –the use of advanced telecommunications technologies to exchange health information and provide health care services across geographic, time, social and cultural barriers." Jim Reid [1] provides one of the many definitions for the term. All such definitions are broad, inclusive, vague and require additional comment.

Telecommunications technologies, the electronic transfer of information, includes a number of modalities. Telephone, radio, other voice modalities, picture phones, fax, computer real time data/images, video teleconferencing (VTC), computer store and forward (enhanced email) data/images, broadcast video, world wide web pages and virtual reality are examples.

Telemedicine information, another inclusive term, includes clinical information from and about patients as well as medical education information and curricula. Computerized clinical information systems, electronic medical records organize huge amounts of clinical information into user friendly formats.

Telemedicine is not a discipline, it is a tool used in the delivery of health care. Telemedicine is a tool forged from the convergence of technologies. Advances in telecommunications, computer science, informatics, basic and clinical science and educational science have matured to allow innovations in health care delivery whose coordinated scientific application can be termed "Telemedicine" or "Telehealth".

Telehealth Hawaii:

Internationally, a renewed interest in telemedicine is powered by new technologies, lowered communications costs and increased demand for health care services. In the U.S, additional momentum has been added by changes in the structure of health care delivery systems such as managed care and capitated payment systems.

Hawaii has long been investing in telecommunications and telehealth technologies. State leaders have had the vision to anticipate the digital revolution and championed the development of the infrastructure necessary to meet our telecommunications needs. State and federal institutions in Hawaii have built networks with the bandwidth (carrying capacity) to meet anticipated needs. The private sector has been aggressive, correctly anticipating the development of telecommunications technology. The cable networks are particularly advanced in relation to the remainder of the nation.

Telemedicine and Telehealth operations have grown in Hawaii as in the rest of the US. The Department of Defense through the Tripler Army Medical Center and the AKAMAI Project have been pioneers and leaders of telemedicine, nationally and internationally. Teleradiology in Hawaii is a mature application with proven utility. All the major community hospitals and health systems have been investigating and investing in telemedicine capabilities. The Hawaii Health Systems Corporation (HHSC) an association of State Hospitals regularly utilize telemedicine technologies. HHSC and community health centers have been recipients of grants from the Weinberg Foundation for telemedicine equipment. University of Hawaii units, such as the Schools of Nursing at Manoa and the community colleges have been using telemedicine technologies for medical education and patient care. Pilot studies using low bandwidth video phones are currently underway. Other health organizations such as third party payers, capitated health plans and medical service organizations are looking to telemedicine to improve their level of functioning.

U.H. John A. Burns School of Medicine (JABSOM):

In medical education, telemedicine is integrated into the JABSOM curriculum. Undergraduate, graduate, post graduate and continuing medical educational programs currently do, or will soon, utilize multiple modalities of telemedicine including store and forward systems as well as real time, full motion, multipoint video teleconferencing.

JABSOM faces unique challenges related to our geographic location, commitment to community based medical education and our problem based learning curriculum. These factors require small group teaching rather than the more traditional lecture hall approach. Small group teaching formats while quite advantageous for the learner, pose a greater challenge to the distance telemedicine educator. The single big group can use a single large monitor or digital projector in specially equipped rooms to allow 2 way video teleconferencing (VTC). One large group, one instructor, one telemedicine video unit, one communication charge; break that one group into 6 or 7 small group sessions and technologic as well as instructional requirements are significantly magnified. These challenges are a small hurdle to overcome when the advantages of small group learning and teaching are considered.

Telemedicine technologies at JABSOM include support for Internet based educational programs. World Wide Web based curricular

programs, store and forward (email) systems and library access are basic requirements for all students. The JABSOM M.D. program curriculum emphasizes Informatics and Evidence Based Medicine in the curriculum making access to computer networks and searchable databases essential.

Ke Ola O Hawai'i[3] is an academic community partnership organization of which the JABSOM is a founding partner. Ke Ola is collaborating with the JABSOM Telemedicine Project to develop a system to support training of multiprofessional teams of health professions students, including medical students, in community health centers and on neighbor islands.

Ke Ola O Hawai'i has developed the Ke Ola HealthNet, which connected community-based learning centers at Waianae Coast Community Health Center, Kalihi-Palama Health Center, Queen Emma Clinics, and Kokua Kalihi Valley, as well as the Biomedical Building of the University of Hawai'i at Manoa, to the state fiberoptic network (SONET). Multiprofessional teams of students and faculty utilize the high speed connection for email communication, research, and utilization of web-based resources. Interactive video workstations provided to community health centers through the JABSOM Telemedicine Project and Weinberg Foundation will expand the resource to include distance learning through interactive video.

Additional resources are in development with support of the federal Area Health Education Center (AHEC) grant to JABSOM, which is administered through the Ke Ola partnership. These include interactive video workstations in Hilo and Maui, which will allow third year medical students in an innovative six month clerkship to remain in neighbor island training sites at Hilo and Maui without returning to the Manoa campus for weekly seminars. Facilities are also being developed at Kauai Community College to support health professions training activities for students from high school, community college, and UH Manoa, including third year medical clerkships.

The Department of Psychiatry, routinely uses point to point live VTC for administrative and educational purposes. The Departments of Medicine and Family Practice use store and forward telemedicine in support of students on rotation in the south pacific and other rural locations. All departments are keenly interested in using technology to leverage educational resources.

U.H JABSOM Telemedicine Project

The UH Telemedicine Project is a task group based in the Dean's office of the School of Medicine. The goals of the project are several. To develop a bank of telemedicine experience and intellectual assets to serve the School of Medicine, The University of Hawaii and the State of Hawaii. The project uses a collaborative approach, fostering cooperative works with other UH schools and campus organizations, community hospitals, health care organizations and state institutions.

The Project is currently setting up a clinical telemedicine network[2] to allow our University students, residents, faculty and community attendings and sub-specialists and other health care providers to learn to use the technologies and techniques of telemedicine both in medical education and in actual patient care. The project invites community collaboration to leverage resources.

Network connections, bandwidth, hardware, software and technical skills needed are being integrated with the generous aid and cooperation from the UH/ Information and Technology Service (ITS) and the UH Telecommunication Information and Policy Group (TIP-G). UH/ITS provides connections that will allow high speed data transfer for VTC as well as store and forward access, to the University of Hawaii system, Community College sites, as well as Waianae Coast Comprehensive Health Center, The Queen Emma Clinics, and the Kalihi Palama Community Health Center. TIP-G has developed and administers the State of Hawaii Telehealth Access Network (STAN) that allows similar connections to HHSC, the VA Regional Medical Clinic, private health care organizations and via satellite, facilities in the Pacific islands.

These broad bandwidth network connections will allow us access to a number of teaching sites for real time VTC with multipoint conferences as well as store and forward modalities. Medical education programs for individuals at all levels of training and in a multitude of different University programs will become readily available. The opportunity is now available for our graduates and faculty associated community health care providers to incorporate the use of telemedicine into their practice of medicine.

Conclusion:

An ever growing choice of developing technologies, begs the question; just because we can do a thing, does that mean we should do a thing? New technologies often emphasize style over substance, offering an elegant, stylish or ostentatious method to a simple task. Technophiles and gadgeteers are often "touched by the monkeys paw", seduced by the dark side of technology. Careful consideration and study of the true benefits from the use of these technologies remains lacking. There are some clear, obvious and undeniable benefits to the use of new technologies. Conversely, there are more subtle advantages and disadvantages that need to be carefully considered. We have the opportunity to study these technologies, to scientifically and rationally assess the utility of these technical advances.

References:

1. A Telemedicine Primer: Understanding the Issues, Jim Reid PA-C 1996ISBN 0-9653045-0-7
2. DoD Cooperative Agreement No. DAMD17-99-2-9003
3. Ke Ola O Hawaii information provided courtesy of Dr. Carol Murry, Director